ACED 2010

15th Asian Conference on Electrical Discharge

PROGRAM

Xi'an Jiaotong University, Xi'an, China

November 7–10th, 2010

15th Asian Conference on Electrical Discharge

ACED 2010

CERTIFICATE

The ACED 2010 conference committee certifies that the name

SYAFRUDIN

has attended the conference and presented a paper.

ACED2010 组委会

The chairman

yanming Li

November 7-10th, 2010

15th ASIAN CONFERENCE ON ELECTRICAL DISCHARGE

ACED 2010

July 20, 2010

Letter of Invitation

Dear Syafrudin,
Diponegoro University,Indonesia

Paper ID: A62
Paper Title: Design of High Voltage Impulse Generator for Application Waste Water Treatment with Corona Discharge Plasma Technology

We are pleased to advise you that your above paper has been approved for the 15th Asian Conference on Electrical Discharge (ACED 2010). It is our great pleasure to invite you to attend ACED2010 held on November 7th – 10th, 2010 in Xi'an, P.R.China.

This conference is a forum for researchers, academics and professionals engaged in the field of electrical discharge, to exchange ideas and discuss recent progress in properties, phenomena and applications of electrical discharges. Topics related to High voltage technology, Pulsed power technology and Electromagnetic fields will also be presented and discussed in the conference.

Please notice that at least one of the authors needs to attend the Conference and present your work. We are very grateful to your attendance, and we are looking forward to seeing you in Xi'an.

If you have any questions, please feel free to contact the ACED 2010 secretariat.

Sincerely Yours,

ACED2010 Chairman
Prof. Yan-Ming Li

yanming Li

ACED2010 Executive Chairman
Prof. Qiao-Gen Zhang

Qiaogen Zhang

ACED 2010 secretariat:

Prof. Guan-Jun Zhang, Sheng-Chang Ji
School of Electrical Engineering, Xi'an Jiaotong University
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Website: http://www.aced2010.com

ACED 2010

XVth Asian Conference on Electrical Discharge

PROGRAM

Organized by

State Key Lab of Electrical Insulation & Power Equipment
Xi'an Jiaotong University, China

Co-organized by

State Key Lab of Power Transmission Equipment & System Security and New Technology, Chongqing University, China

Supported by

National Natural Science Foundation of China (NSFC)

Chinese Society of Electrical Engineering (CSEE)

China Electrotechnical Society (CES)

November 7-10th, 2010

Xi'an, China

Abdul Syakur
INDONESIA

Published by Shaanxi Tianchengweiye Meeting Planning Co. Ltd

Address: Room 403, Zizhu Building Center Tower B, 106 West South 2nd Ring Road, Xi'an, China

Welcome to ACED 2010 in China!

On behalf of the organizing committee, I am honored to welcome all colleagues from around the world to attend the 15th Asian Conference on Electrical Discharge (ACED) in Xi'an, China on November 7-11, 2010.

The conference is organized by Xi'an Jiaotong University, and co-organized by Chongqing University, China. The conference will be held at XJTU Nanyang Hotel, which is near Xi'an Jiaotong University with about 5 minute's walk.

ACED2010 will be a great event in the field of electrical discharge, and also other related fields. More than 200 full papers have been accepted for the conference CD. Many world-famous experts and professors in electrical discharge will be invited to attend the Conference and make invited talks. ACED founders will be invited to make memorial lectures. You can attend the oral and poster sessions to discuss recent progress and exchange ideas in phenomena, characteristics and applications of electrical discharges, and also other interesting high voltage insulation issues.

We believe the conference will be a key stage to improve electrical discharge research level, especially in the Asian-Pacific region, show our great development to the world in the field of discharge and plasma academic research.

Xi'an is the provincial capital of Shaanxi Province, China, and it is the cultural and economic center of Western China. Historically 13 dynasties placed their capitals here for more than 1300 years. There are numerous famous historical sites waiting for your visit and discovery.

As the General Chair of 15th ACED, I would like to extend my warm welcome to all participants to attend ACED2010.

I wish you a joyous and rewarding stay in Xi'an.

Nov.2010

Yanming Li

Prof. Yan-Ming Li

Chairman of ACED2010

Scope

The Asian Conference on Electrical Discharge (ACED) is a non-profit, international organization whose purpose is to encourage the advancement of the science and application of phenomena and applications of electrical discharges, primarily by conducting symposia for the exchange of scientific information. Symposia are held biennially (every two years).

The Conference is an interdisciplinary meeting for the exchange of results, presentation of progress and discussion of ideas and challenges for the future in the field of electrical discharges. Both fundamental and application aspects are covered. The Conference programs consist of memorial, lectures, invited speeches, oral and poster presentations.

Contents

1. ACED2010 Organization

International Steering Committee

K. Hidaka (Chair, Japan)
J-Y. Koo (Co-Chair, Korea)
Z. C. Guan (Co-Chair, China)
N. Hayashi (Secretary, Japan)
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Ming-Zhe Rong (Xi'an Jiaotong Univ.)
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Deng-Ming Xiao (Shanghai Jiaotong Univ.)
Wen-Jun Zhou (Wuhan Univ.)
Ping Yan (Institute of Electrical Engineering, CAS)
Fu-Chang Lin (Huazhong Univ. of Science and Technology)
Rui-Jin Liao (Chongqing Univ.)
Qiao-Gen Zhang (Xi'an Jiaotong Univ.)
Guan-Jun Zhang (Xi'an Jiaotong Univ.)
Bo-Xue Du (Tianjin Univ.)
Guang-Ning Wu (Southwest Jiaotong Univ.)
Yan-Peng Hao (South China Univ. of Technology)

Local Organizing Committee

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Sheng-Tao Li (Xi'an Jiaotong Univ.)
Guan-Jun Zhang (Xi'an Jiaotong Univ.)
Lan-Jun Yang (Xi'an Jiaotong Univ.)
Sheng-Chang Ji (Xi'an Jiaotong Univ.)
Jiang-Tao Li (Xi'an Jiaotong Univ.)
Wei-Dong Ding (Xi'an Jiaotong Univ.)
Jian Li (Chongqing Univ.)

ACED 2010 Secretariat

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Email: aced2010@mail.xjtu.edu.cn
Website: http://www.aced2010.com

2. General Information

2.1 Getting to Xi'an

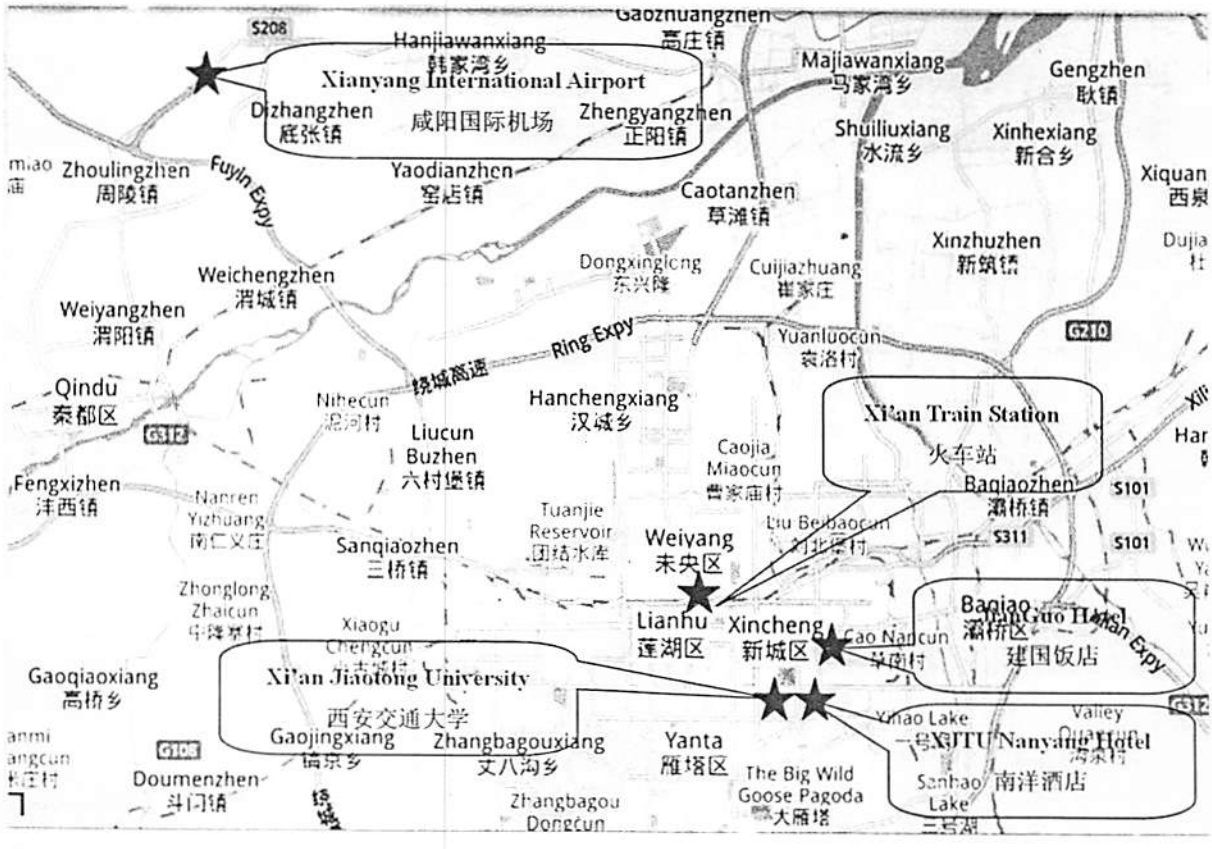
By Train

Between Xi'an and many cities in China, there are direct trains, such as Beijing, Shanghai and Guangzhou, *et al.*

By Airplane

You can fly to Xi'an Xianyang International Airport, located about 45km from the urban district.

2.2 City Map and Public Transport

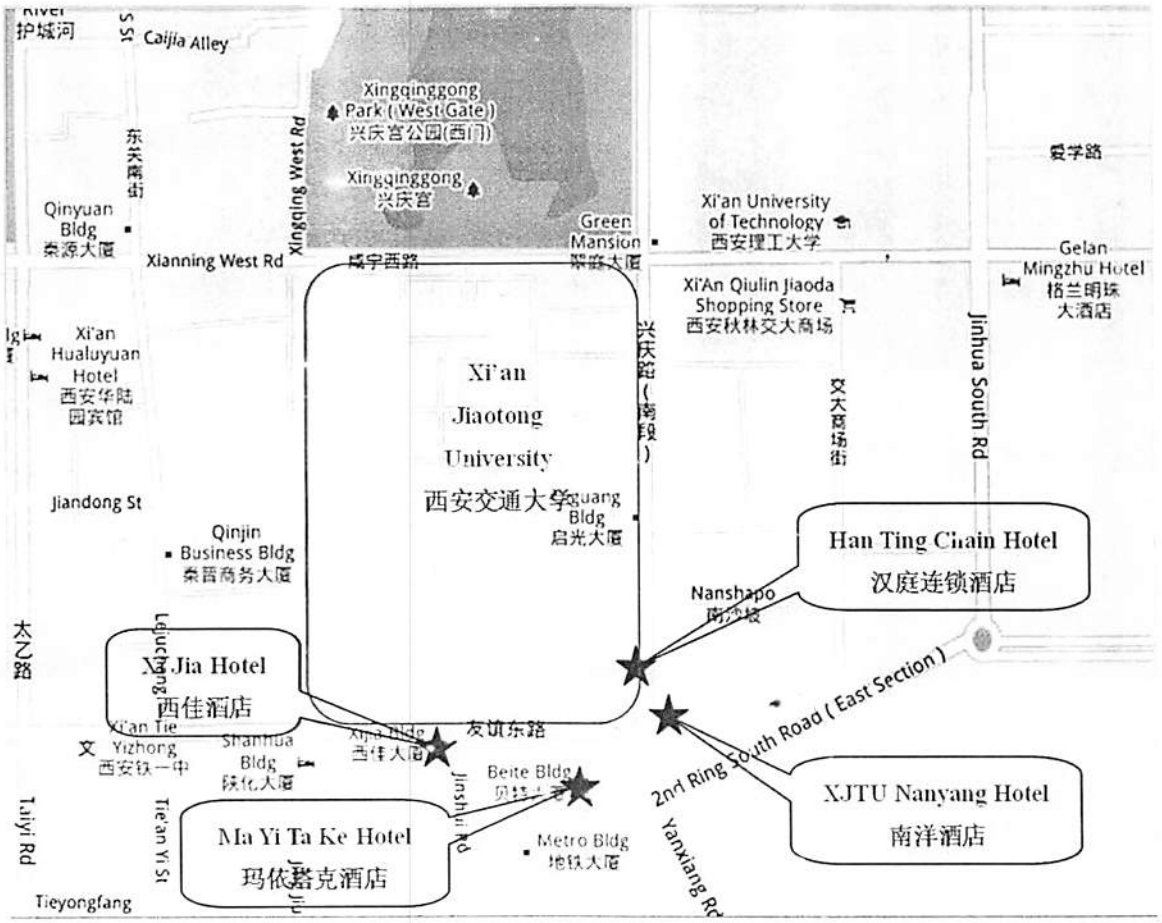


From Xianyang International Airport to XJTU Nanyang Hotel, you can take a

taxi for less than 1.5hour and RMB150, or you can take an Airport Bus (Airport —JianGuo Hotel) to the urban district (RMB25 and about 1.5h), and then take a taxi (about RMB6 and 10 minutes) or take a city bus (No.401) to Nanyang Hotel.

From Train Station to XJTU Nanyang Hotel, you can take a taxi (about RMB15 and 30 minutes) or take a city bus (No.33/20/607/25).

2.3 Conference Location and Hotels



The ACED2010 will be held at Nanyang Hotel of Xi'an Jiaotong University (XJTU). Near XJTU Nanyang Hotel, there are also several other hotels for your accommodations. You can walk to Nanyang Hotel less than 10 minutes.

2.4 Information of Oral and Poster

INVITED SPEECH: Each Invited Lecture is for 30 minutes, including 1 minute for introduction and change over of speakers, 24 minutes for oral presentation and 5 minutes for discussion.

NORMAL ORAL: The maximum allocated time will be 15 minutes including 1 minute for introduction and change over of speakers, 12 minutes for oral

presentation, and 2 minutes discussion.

Public computer and LCD projector are available. Use of personal laptop/notebook is generally not acceptable. The presentation will be given in Microsoft Power Point or Adobe PDF. It is suggested copying your presentation files while your on-site registration.

POSTER: The poster session will be 1 hour length. A panel with size of at most 1.2m height and 0.9m width will be provided for each paper. Preparation to paste your poster on panel is 2 hours before the poster sessions begin.

2.5 Weather Condition

In November, it is the late autumn of Xi'an. The weather condition is a little dry and usually sunny, and the temperature is about 5-20 degree Celsius. The temperature difference of day and night is great. All attendee are recommended to bring appropriate clothes.

2.6 Insurance

The conference organization cannot be made liable for accidents to conference participants for damage or loss of personal properties or for health problem. All attendee are strongly recommended to have appropriate insurance before leaving their home country. This insurance is to be purchased in your country of origin.

2.7 Registration

The conference on-site registration services will be available at the first floor of XJTU Nan Yang Hotel, Xi'an, China. The registration desk will be open during the following time:

November 7th~9th, 2010
8:00-12:00am, 2:00-6:00pm

On-site payment for the conference fee will be accepted in the form of cash and credit card. Student Registration is available for registered full-time students.

Registered participants will receive:

- A Badge with Conference Mark and Personal Information

- A Bag with Conference Mark
- Program of ACED2010
- Conference CD
- Tickets for Welcome Party, Banquet, Lunches
- Tickets for Technical Tour I and II

Badges:

Your named badge is used as your pass during the Conference. For tours and social events, tickets are required. Admission to the session is restricted to registered participants wearing their name badges. All participants and accompanying persons are kindly requested be with your named badges during all conference events.

There are different badge colors by which delegates can be recognized:

Invited Speaker	Red
Regular Participant	Green
Student Participant	Blue
Accompanying Person	Orange
Organizing Committee	Yellow
Conference Staff	Purple

2.8 Xi'an Jiaotong University and SKLEIPE

110 years ago, Xi'an Jiaotong University held high the banner of "Saving China by Industry" and shouldered the heavy task of "Strengthening China and Chinese People", "Seeking Practical Knowledge" and "Doing Practical Businesses" and trained many outstanding talents of a few generations. Jiang Zemin, Qian Xuesen, Wu Wenjun, Zhang Guangdou, Jiang Zhenghua and Han Qide are the representatives. They have made great contribution to the boom and prosperity of our motherland. The people of Xi'an Jiaotong University invented the first dynamo, the first radio-station, the first diesel, the first Chinese typewriter in China.

Today, Xi'an Jiaotong University passed the key construction of national "Seventh Five-Year Plan" "Eighth Five-Year Plan", "211 Project" and "985

Project". It has developed into a university that has the feature of science and Engineering and covers 9 subjects such as science, engineering medicine, economics, management, art and law. It has become an important base that is the integration of talents training, scientific research and social services and propels the social development.

SKLEIPE (State Key Laboratory of Electrical Insulation and Power Equipment) at Xi'an Jiaotong University was established in 1991 and formally opened to the public in October 1995. At present, the Laboratory is an important state-level scientific research base in the field of scientific research, academic exchanges, cultivation of the highly qualified talents and technology transfer. The laboratory is managed by the Director, Professor Wang Jianhua and the Director of the Academic Committee, Professor Lei Qingquan who is a member of the Chinese Academy of Engineering.

The research fields of the Laboratory involves: (1) Structures, properties, characterizations and applications of dielectric materials (including nano-composites, biodielectrics); (2) Electrical equipment and its intellectua-llization; (3) Life management of electrical equipment and its electrical insulation system; (4) Advanced technology of electrical engineering. The Laboratory possesses advanced instruments and state-of-the-art capabilities with a present market value of about $4.1 million. These facilities are nationally competitive and capable of providing highly precise and systematic research tools to prospective investigators.

The laboratory has a dedicated research team, who are creative and with interdisciplinary research attitude as well as cooperative spirit. It maintains the policy of "Open, Flexible, Cooperative and Competitive". The laboratory has become a world-known source and base for remarkable contributions in scientific research, education, academic exchanges, and technology transfer in the general field of Electric Power in China.

2.9 Chongqing University and SKL-PES

Chongqing University is founded in 1929, which is a nationally famed comprehensive key university in China, directly under the State Ministry of Education, also a university listed among the first group of "211 Project" universities gaining preferential support in their construction and development from the Central Government of China. Currently, Chongqing University runs a graduate school and offers a wide range of undergraduate programs covering diverse branches of learning such as sciences, engineering, liberal arts, economics, management, law and education.

State Key Laboratory of Power Transmission Equipment & System Security and New Technology (SKL-PES) in Chongqing University was approved to establish by Ministry of Science and Technology in 2006. Its construction program was confirmed in 2007 and passed the inspection by Ministry of Science and Technology in April 2010. Professor Liao Ruijin, the winner of the National Science Fund for Distinguished Young Scholars, now serves as the head of the laboratory and Professor Sun Caixin, member of CAE, serves as the head of academic committee.

The laboratory has now built up three research directions, including Operation Security of Power Equipment and System, Condition Monitoring and Security Assessment of Power Equipment, and Electrical New Technology and its Application in Security of Power System.

3. Social Program

3.1 Welcome Reception

A Welcome Party will be held from 18:00-20:00, November 7, 2010 at XJTU Nan Yang Hotel. This will be a good chance to meet your old friends and to know new friends.

3.2 Technical and Campus Tour

A Technical Tour to Xi'an High Voltage Apparatus Research Institute will be scheduled in the afternoon of November 9th, 2010.

A Campus Tour of Xi'an Jiaotong University will be scheduled in the morning of November 10th, 2010. Some labs will be scheduled in the campus tour, such as the State Key Laboratory of Electrical Insulation & Power Equipment, Xi'an Jiaotong University.

3.3 Banquet

A Banquet with Tang Dynasty Music and Dance Show will be held after Technical Tour I. It will be at Shaanxi Grand Opera House, from 18:00-21:00, November 9th, 2010.

3.4 Coffee Break and Lunch

Coffee, tea, soft drinks as well as small snacks will be provided during the coffee breaks and poster sessions in the Corridor at the 2nd Floor of Nanyang Hotel.

Free lunch is available in Nanyang Hotel every day during the conference except for the time of banquet, sightseeing and technical tour.

3.5 Sightseeing around Xi'an

Post-conference sightseeing around Xi'an is arranged from November 11th, 2010. The related costs are not covered in your registration fee.

4. Scientific Program

4.1 Conference Schedule

<table>
<tr><th></th><th>Site</th><th>8:30–10:10</th><th>10:10-10:30</th><th>10:30-11:50</th><th>12:00-13:30</th><th>13:30-15:30</th><th>15:30-16:30</th><th>16:30-17:50</th><th>18:00-20:00</th></tr>
<tr><td rowspan="2">Nov. 7
Sunday</td><td>Hotel Lobby</td><td colspan="7">Registration</td><td></td></tr>
<tr><td>Dining Hall</td><td colspan="7"></td><td>Welcome Party</td></tr>
<tr><td rowspan="6">Nov. 8
Monday</td><td>Hotel Lobby</td><td colspan="3">Registration</td><td rowspan="6">Lunch
(ISC&IAC Meeting)</td><td colspan="3">Registration</td><td rowspan="6">Committee Meeting of New High Voltage Technology
(ISC&IAC Invited)</td></tr>
<tr><td>Int. Meeting Room</td><td>Opening & Plenary Session</td><td>Break & Photo</td><td>Opening & Plenary Session</td><td></td><td></td><td></td></tr>
<tr><td>Meeting Room 8C</td><td></td><td></td><td></td><td>Oral A-1</td><td rowspan="4">Coffee Break
&
Poster I</td><td>Oral A-2</td></tr>
<tr><td>Meeting Room 6</td><td></td><td></td><td></td><td>Oral B-1</td><td>Oral B-2</td></tr>
<tr><td>Meeting Room 7</td><td></td><td></td><td></td><td>Oral C-1</td><td>Oral C-2</td></tr>
<tr><td>Corridor</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="4">Nov. 9
Tuesday</td><td>Meeting Room 8C</td><td>Oral A-3</td><td rowspan="4">Coffee Break</td><td>Oral A-4</td><td rowspan="4">Lunch</td><td colspan="2" rowspan="4">Technical Tour I
(13:00~17:00)</td><td colspan="2" rowspan="4">Show Watching & Banquet
(17:00~21:00)</td></tr>
<tr><td>Meeting Room 6</td><td>Oral B-3</td><td>Oral B-4</td></tr>
<tr><td>Meeting Room 7</td><td>Oral C-3</td><td>Oral C-4</td></tr>
<tr><td>Corridor</td><td></td><td></td></tr>
<tr><td rowspan="4">Nov. 10
Wednesday</td><td>Meeting Room 8C</td><td>Oral A-5</td><td colspan="2" rowspan="4">Technical Tour II
(10:10~11:50)</td><td rowspan="4">Lunch</td><td>Oral A-6</td><td rowspan="4">Coffee Break
&
Poster II</td><td rowspan="4">Closing Session</td><td rowspan="4"></td></tr>
<tr><td>Meeting Room 6</td><td>Oral B-5</td><td>Oral B-6</td></tr>
<tr><td>Meeting Room 7</td><td>Oral C-5</td><td>Oral C-6</td></tr>
<tr><td>Corridor</td><td></td><td></td></tr>
<tr><td>Nov. 11
Thursday</td><td></td><td colspan="8">Post-Conference Tour (Optional)</td></tr>
</table>

Note:

1. All the Sessions will be held on the 2nd Floor of XJTU Nanyang Hotel.
2. Participants of Technical Tour I & II will be gathered in front of XJTU Nanyang Hotel.
3. Please pay attention to the time of each Session and Tour.

If you have any questions, please feel free to contact:

Prof. Sheng-Chang Ji: +86-29-82668906 +86-135-1917-5013
Ms. Feng-Ling Liu: +86-139-9287-9967
Prof. Guan-Jun Zhang: +86-29-82668172 +86-158-0294-5353

4.2 Opening & Plenary Session

Opening & Plenary Lecture Session
Monday 8 November, 8:30-11:50
Venue: International Meeting Room, 2nd Floor, Nanyang Hotel
Chair: Prof. Guan-Jun Zhang

Opening Ceremony

O-1 **Opening Address from Xi'an Jiaotong University and State Key Laboratory**
Vice President of Xi'an Jiaotong University and Dean of State Key Laboratory

O-2 **Opening Address from ACED2010 Chair**
Yan-Ming Li, Qiao-Gen Zhang

O-3 **Opening Address from ACED International Steering Committee Chair**
Kunihiko Hidaka

Invited Speech
Chair: Prof. Zhi-Cheng Guan

I-1 **Partial Discharge Location in Power Transformers Based on Ultra-Wide Band Radio Frequency Detection**
Cheng-Rong Li, Shu-Sheng Zheng, Zhi-Guo Tang, Wen-Zhi Chang

I-2 **For Advanced Measurement of Surface Charge on Insulator**
Akiko Kumada

Group Photograph

I-3 **Phase-resolved Measurement, Analysis, Modeling and Simulation of Partial Discharges: A Holistic Approach**
Suwarno

I-4 **Modelling of Electroluminescence in High Voltage Polymeric Material using Dimensional Analysis: Comparison of EL under Varying Field and Frequency**
N.A. Bani, H. Ahmad, D.H. Mills, P.L. Lewin

12:00-13:30, Lunch (ISC&IAC Meeting)
Venue: Dining Hall, 1st Floor

4.3 Oral Sessions

[A – Oral Session]

A-1. Corona, glow, spark and arc discharges
Monday 8 November, 13:30-15:30
Venue: Meeting Room 8C
Chair: Prof. Kunihiko Hidaka

1	**Filamentary Discharge in the Outer Peripheral Region of Glow Discharge** *Qi-Zheng Ye, Huan-Qing Cai, Xing-Wang Li, Yun-Fei Wu, Dan Tan*	**B149**
2	**Study on Breakdown Characteristics of N_2-SF_6 and CO_2-SF_6 Gas Mixtures** *Wei Zhou, Li-Ming Shen, Gui-Feng Zhang, Xu-Dong, Li, You-Ping Tu, Li-Jian Ding*	**B066**
3	**Overvolted Breakdown and Gaseous Recovery in Short Nitrogen Spark Gaps** *Xin-Jing Cai, Xiao-Bin Zou, Xin-Xin Wang, Li-Ming Wang, Zhi-Cheng Guan*	**B102**
4	**Matching between Bipolar Pulsed Power and Packed-Bed Reactor Used for Exhaust Treatment** *Hui Liu, Ruo-Bing Zhang , Li-Ming Wang , Zhi-cheng Guan, Zhi-Dong Jia*	**B140**
5	**Experimental Study on the Characteristics of Pulse Discharge in the Subsonic Airflow** *Lei Pang, Qiao-Gen Zhang, Bao-Zhong Ren, Kun He, Qing Zhou*	**B166**
6	**Examination of Energy Dissipation of Powerful Pulsed Electron Beam in High-pressure Gases** *R.V. Sazonov, Yu. N. Novoselov, G.E.Kholodnaya, B.S. Kochkorov, D.V. Ponomarev, G. E. Remnev, Yu. I. Isakova, A.P. Yalovets*	**A029**
7	**Characteristics of Upward Leader in Rod-to-rod Discharges under Switching Impulse Voltage** *Shi-jun Xie, Shan-qiang Gu, Wei-jiang Chen, Jia-hong Chen, Jun-jia He, Heng-xin He, Nian-wen Xiang*	**B141**
8	**Inhibition of Surface Flashover Based on High Power GaAs Photoconductive Switches Triggered by Laser** *Ming Xu, Wei Shi , Shao-Qiang Wang*	**B091**
P1	**Introduction to Poster Session 1** *P1 Session Chair: Prof. Jiang-Tao Li*	

Poster I & Break
Monday 8 November, 15:30-16:30
Venue: Corridor

A-2. Corona, glow, spark and arc discharges
Monday November 8, 16:30-17:50
Venue: Meeting Room 8C
Chair: Prof. Cheng-Rong Li

1 **Measurement of Pressure Distribution of Shock-wave Generated by a Pulsed Arc Discharge in Water under Various Experimental Conditions** **A078**

Hirofumi Shinozaki and Noriyuki Hayashi

2 **Effect of Space Charge on Propagation Path of Air Gap Discharge** **B017**

Li-Xia Hao, Xiao-Hui Han, Wei Wang, Hua-Mao Zhan, Xin Jin

3 **Current Density Ratio Mathematics Modeling of Wireplane Corona Discharge** **B104**

Tie-Lei Sun, Cheng Lin, Feng-Chun Sun

4 **Branching Angles of Positive Streamer under Lightning Impulse Voltages** **B118**

Yi-Nan Geng, Rong Zeng, Jin-Liang He and She Chen

5 **Research of the Flashover in Back-triggered PCSS under High-voltage** **B074**

Wei Shi , Ji-Qiang Jia, Wei-Li Ji, Hui-Meng Gui

Monday 8 November, 18:00-20:00
Dinner & Committee Meeting of New High Voltage Technology (ISC&TAC Invited)
Venue. Dining Hall, 1st Floor

A-3. Pulsed power source and technology

Tuesday 9 November, 8:30-10:10
Venue: Meeting Room 8C
Chair: Prof. Ping Yan

1 **The One-surface Multipactor Based on DC Space-charge Self-consistent Field and Insulated Magnetic Field** **B009**

Yu Zhang, Jian-Hong Hao, Jie-Qing Fan

2 **Multichannel Discharge Characteristics of Gas Switch Gap in SF_6-N_2 or SF_6-Ar Gas Mixtures under Nanosecond Triggering Pulses** **B139**

Jia-Sen Chang, Hu Wang, Qiao-Gen Zhang, Ai-Ci Qiu

3 **Rise Time Reduction of Rectangular Pulse Using Magnetic Switch** **B147**

Jie Chen, Ruo-Bing Zhang, Li-Ming Wang, Da-Peng Liang

4 **Research on the Closing Characteristics of the Laser-Triggered Vacuum Switch** **B168**

Jun-Xiang Liu, Zheng-Hao He, L. Zhu, Zhao-Liang Zhang, Yu-Hang Xu

5 **Effect of the Circuit and Wire Parameters on Exploding an Al Wire in Water** **B165**

Qing Zhou, Qiao-Gen Zhang, Jun Zhang, Jun-Ping Zhao, Bao-Zhong Ren, Lei Pang

6 **Based on Heat Conduction Model for the Longevity of GaAs PCSS** **B076**

Wei Shi, Tian-Jian Mi, Meng-Xia Li, Hou Rong

7 **Building of Magnetic Field Loading Equipment and Research of Its Magnetic Performance in Electromagnetic Test System of Particle Velocity** **B093**

Jin Li, Zu-Tang Wu, Qiang Lu, Zhan-Jiang Wang, Jing-Sen Zhang, Yun-Liang Li, Chao-Jun Men, Zhi-Yun Guo, Zhao Wang, Chao Wen

10:10-10:30, Coffee Break
Venue: Corridor

A-4. Plasma generation and diagnostic technology

Tuesday 9 November, 10:30-11:50
Venue: Meeting Room 8C
Chair: Prof. Jun-Jia He

1 **Design of High Voltage Impulse Generator for Application Waste Water Treatment with Corona Discharge Plasma Technology** A62
Agung Warsito, Abdul Syakur, Fajar Arifin, Syafrudin

2 **Effects of Applied Sinusoidal Voltage on Temporal Nonlinear Behavior in Helium Atmospheric Dielectric Barrier Discharge** B096
Dong Dai, Hao-Xing Hou, Yan-Peng Hao

3 **A Combined Distribution Model for Evaluation of Cross Sections** A27
Govinda Raju and Nimal Weeratunga

4 **The Effect of Frequency on Atmospheric-Pressure Glow Discharge Sustained by a Resonant Power Supply** B094
Feng Li, Fang Li, Wei-Dong Ding, Qiao-Gen Zhang

5 **Characteristics of Glow Discharges at Atmospheric Pressure in Helium** B095
Yan-Peng Hao, Yao-Ge Liu, En-Lai Tu, Dong Dai

12:00-13:00, Lunch
Venue: Dining Hall, 1st Floor

Tuesday 9 November, 13:00-17:00
Technical Tour I (Xi'an High Voltage Apparatus Research Institute)
Venue: Gathering in front of XJTU Nanyang Hotel

Tuesday 9 November, 17:00-21:00
Show Watching and Banquet
Venue: Shaanxi Grand Opera House

A-5. Plasma generation and diagnostic technology

Wednesday 10 November, 8:30-10:10
Venue: Meeting Room 8C
Chair: Prof. Yasuhiro Tanaka

1 **Influence of Anodic Porous Alumina with Straight Nanopores on Dielectric Barrier Discharge in Atmospheric-Pressure Air** A01
Toshiyuki Kawasaki, and Jie-Ming, Yu

2 **Repetitive Frequency Marx Generator based on Magnetic Switches and its Application in Dielectric Barrier Discharge** B097
Bin Ma, Hang Ren, Wei-Dong Ding, Qiao-Gen Zhang, Lan-JunYang, Jia-Wei Liu

3 **Simulation of Atmospheric Dielectric Barrier Discharge Excited by Unipolar Pulsed Voltage** B146

Design of High Voltage Impulse Generator for Application Waste Water Treatment with Corona Discharge Plasma Technology

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Abstract — **Environmental pollution caused by the pollution in soil, water and air becoming more complex. One of the technologies to solving the water and air pollution problem is Plasma Technology. Corona Discharge Plasma can be formed by connecting high voltage with two electrodes in custom distance. Nevertheless high voltage equipment is usually in a big-scale, hard in use, expensive, and non-portable thus less efficient in use for practical application to generate corona discharge plasma. Considering the essence of the high-voltage generator, so the expectation of this research is able to create portable high-voltage generator, easy in use also cheap to produce. Therefore high-voltage generator is able to generate corona discharge plasma then applicable in soft-drink wastewater treatment. With the addition of flow-rate oxygen in plasma corona discharge reactor as ionized matter for producing ozone, hopefully wastewater treatment in soft-drink industry become more effective. High voltage generator was made by impulse high-voltage using fly-back transformer, whereas plasma corona discharge reactor builds of geometry configuration of needle-plate electrodes.**

The investigated results showed that the high voltage equipment generates output high-voltage form of impulse and the variation of the peak voltage between 0 - 20.000 volt with frequency 6246 hertz until 6811 hertz. The formation of corona discharge plasma depends on the voltage, when increase the voltage then more extend and large the discharge filament. The waste water treatment of soft-drink industry using corona discharge plasma technology is more effective. Variation of applied high voltage and amount of circulation affects decreasing quality of percentage such as COD, TSS, and color of soft-drink wastewater. Meanwhile the frequency of circulation didn't have significant effect. The largest decrease of percentage of qualities of COD, TSS and color of soft-drink wastewater achieved at 18.000 Volt after sixth circulation. The succeeding values are 98,72 %, 98,66 % and 99,05 % respectively.

I. INTRODUCTION

To overcome the problem of water pollution may be one way to take advantage of the plasma corona discharge. Basically, this process is the process of the formation of ozone, ion hydroxyl and free radicals that act to break organic substances in the waste water. How it works, waste water charged corona discharge. While the corona discharge can apply the high voltage on the two electrodes are presented with a certain distance.

High-voltage equipment can be obtained from the alternating current high voltage (AC), direct current high voltage (DC) and high-voltage impulse. However, high-voltage equipment of the existing system is still in a big, difficult in use, expensive and not portable, so is less effective to use for practical application to generate corona discharge plasma.

Therefore it is required a high voltage generator device that able to generate corona discharge plasma for the application of waste water treatment in portable shape and not using vast area, easy on operational and low-price to produce.

II. CORONA DISCHARGE PLASMA REACTOR

Waste water treatment corona discharge plasma reactor uses needles to plate electrode configuration with air gap space. The needles used for positive electrode made from copper wire with diameter 15 mm and length 25 mm, each separated with interval 8 mm and 10 mm. Whereas negative plate electrode made from copper with length 160 mm and width 110 mm. There is air gap between needles and plate electrode with interval 15 mm for corona discharge area, oxygen gas flow and waste water. Test scheme is shown in Figure 1.

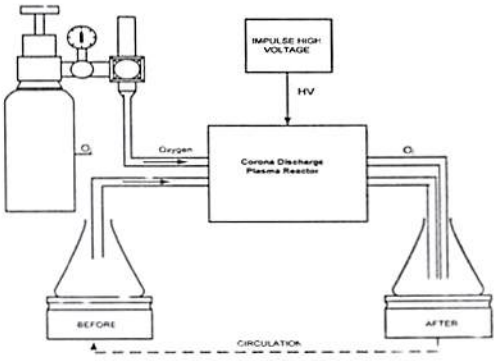

Figure .1 Waste water treatment corona discharge plasma reactor scheme.

III. RESULTS AND DISCUSSION

Analysis of characteristics of early industrial liquid waste drink was done before the sample of waste processed. Analysis of the characteristics of early results of the sample liquid waste can be seen in table 4.1:

Table 4.1. Result of the first analysis of waste water soft drink industry

No	Parameter	Unit	Standard	The first analysis	Please processing
1	pH		6,0-9,0	8,00	Not
2	COD	mg/L	300	6715,60	Yes
3	TSS	mg/L	90	7320,23	Yes
4	Oil and Fat	mg/L	9	3,44	Not
5	Color	PtCo	-	10025,00	Yes

IV. REFERENCES

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